## **CLAIMS**

- A bone graft substitute composition, consisting essentially of: calcium sulfate;
   a mixing solution; and
   a plasticizing substance.
- 2. The composition of claim 1, wherein the calcium sulfate comprises calcium sulfate hemihydrate.
- 3. The composition of claim 1, wherein the plasticizing substance comprises a cellulose derivative.
- 4. The composition of claim 1, wherein the plasticizing substance is selected from a group consisting of sodium carboxymethylcellulose, methylcellulose, hydroxypropyl methyl cellulose, hydroxypropyl cellulose, ethylcellulose, hydroxyethylcellulose, and cellulose acetate butyrate.
- 5. The composition of claim 1, wherein the plasticizing substance comprises hydroxypropyl methyl cellulose.
- 6. The composition of claim 1, wherein the plasticizing substance comprises hydroxypropyl cellulose.
- 7. The composition of claim 1, wherein the plasticizing substance comprises hyaluronic acid.
- 8. The composition of claim 1, wherein the plasticizing substance comprises methylcellulose.
  - 9. The composition of claim 1, wherein the mixing solution is selected from a

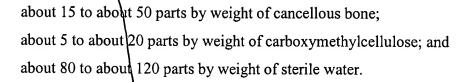
group consisting of sterile water, inorganic salt, and cationic surface active agent.

- 10. The composition of claim 9, wherein the cationic surface active agent is selected from a group consisting of sodium chloride, phosphate buffered saline, potassium chloride, sodium sulfate, ammonium sulfate, ammonium acetate, and sodium acetate.
- 11. The composition of claim 1, wherein the mixing solution comprises sterile water.
- 12. The composition of claim 1, wherein the composition does not comprise a polymer matrix.
- 13. The composition of claim 1, wherein the composition does not comprise bone.
  - 14. The composition of claim 1, consisting essentially of:100 parts by weight of the calcium sulfate;about 1.5 to about 8 parts by weight of the plasticizing substance; and about 25 to about 65 parts by weight of the mixing solution.
  - 15. The composition of claim 1, consisting essentially of:100 parts of the calcium sulfate;about 5.25 parts by weight of the plasticizing substance; andabout 33.6 parts by weight of the mixing solution.
  - 16. A bone graft substitute composition, comprising: calcium sulfate; demineralized bone matrix; cancellous bone; a plasticizing substance; and

a mixing solution.

- 17. The composition of claim 16, wherein the calcium sulfate comprises calcium sulfate hemihydrate.
- 18. The composition of claim 16, wherein the plasticizing substance comprises a cellulose derivative.
- 19. The composition of claim 16, wherein the plasticizing substance is selected from a group consisting of sodium carboxymethylcellulose, methylcellulose, hydroxypropyl methyl cellulose, hydroxypropyl cellulose, ethylcellulose, hydroxyethylcellulose, and cellulose acetate butyrate.
- 20. The composition of claim 16, wherein the mixing solution is selected from a group consisting of sterile water, inorganic salt, and cationic surface active agent.
- 21. The composition of claim 20, wherein the cationic surface active agent is selected from a group consisting of sodium chloride, phosphate buffered saline, potassium chloride, sodium sulfate, ammonium sulfate, ammonium acetate, and sodium acetate.
- 22. The composition of claim 16, wherein the mixing solution comprises sterile water.
  - 23. The composition of claim 16, comprising:
    about 80 to about 120 parts by weight of calcium sulfate;
    about 10 to about 100 parts by weight of demineralized bone matrix;
    about 10 to about 100 parts by weight of cancellous bone;
    about 1 to about 40 parts by weight of a plasticizing substance; and
    about 21 to about 250 parts by weight of a mixing solution.

- 24. The composition of claim 16, comprising:
  about 90 to about 110 parts by weight of calcium sulfate;
  about 10 to about 50 parts by weight of demineralized bone matrix;
  about 15 to about 50 parts by weight of cancellous bone;
  about 5 to about 20 parts by weight of a plasticizing substance; and
  about 80 to about 120 parts by weight of a mixing solution.
- 25. The composition of claim 16, comprising:
  about 98 to about 102 parts by weight of calcium sulfate;
  about 13 to about 23 parts by weight of demineralized bone matrix;
  about 27 to about 33 parts by weight of cancellous bone;
  about 15 to about 20 parts by weight of a plasticizing substance; and
  about 95 to about 105 parts by weight of a mixing solution.
- 26. The composition of claim 16, comprising:
  about 100 parts by weight of calcium sulfate;
  about 18 to about 19 parts by weight of demineralized bone matrix;
  about 27 to about 28 parts by weight of cancellous bone;
  about 17 to about 18 parts by weight of a plasticizing substance; and about 101 to about 102 parts by weight of a mixing solution.
- 27. A bone graft substitute composition, comprising: about 80 to about 120 parts by weight of calcium sulfate hemihydrate; about 10 to about 100 parts by weight of demineralized bone matrix; about 10 to about 100 parts by weight of cancellous bone; about 1 to about 40 parts by weight of a carboxymethylcellulose; and about 21 to about 250 parts by weight of sterile water.
- 28. The composition of claim 27, comprising:
  about 90 to about 110 parts by weight of calcium sulfate hemihydrate;
  about 10 to about 50 parts by weight of demineralized bone matrix:



- 29. The composition of claim 27, comprising:
  about 98 to about 102 parts by weight of calcium sulfate hydrate;
  about 13 to about 23 parts by weight of demineralized bone matrix;
  about 27 to about 33 parts by weight of cancellous bone;
  about 15 to about 20 parts by weight of carboxymethylcellulose; and
  about 95 to about 105 parts by weight of sterile water.
- 30. The composition of claim 27, comprising:
  about 100 parts by weight of calcium sulfate hemihydrate;
  about 18 to about 19 parts by weight of demineralized bone matrix;
  about 27 to about 28 parts by weight of cancellous bone;
  about 17 to about 18 parts by weight of carboxymethylcellulose; and
  about 101 to about 102 parts by weight of sterile water.

